Redding Sub-basin
Sub-basin-level Review of Proposed Projects

Sub-basin Water Requirements and Sources

The Redding Sub-basin (see Figure 1 in the Introduction and Figure 1 at the end of this sub-basin review) is located at the northern end of the Sacramento Valley within Shasta County. The basin incorporates about 430 square miles and includes 12 primary water purveyors who serve a population of approximately 150,000 residents. Sub-basin water requirements (ranging from 250,000 to 300,000 acre-feet [ac-ft]) are approximately two-thirds agricultural and one-third municipal and industrial (M&I). The majority of water purveyors in the sub-basin are Central Valley Project (CVP) contractors; Anderson-Cottonwood Irrigation District (ACID) and City of Redding are the primary settlement contractors, and water service contractors include both agricultural and M&I users. Several purveyors and many individual water users also pump groundwater as a portion of their supply.

Settlement Contractors account for about 55 to 60percent of total supply in the sub-basin (170,000 acre-feet per year [ac-ft/yr] on average; 145,000 ac-ft/yr in drought years). Water service contracts account for about 15 percent of total supply in the sub-basin (45,000 ac-ft/yr on average; 48,000 ac-ft/yr in drought years). Groundwater accounts for about 15 to 20 percent of total supply in the sub-basin (46,000 ac-ft/yr on average; 57,000 ac-ft/yr in drought years).

Water Requirements/Shortages

Under current conditions, total sub-basin requirements are typically met in normal years, with shortages of approximately 50,000 ac-ft in critically dry years. M&I supply requirements in both normal and drought years are met using groundwater, given CVP contract quantities cannot meet full requirements. The supply and demand balance varies greatly between the purveyors in the sub-basin with some having adequate supply for all but critically dry years, and others facing deficits under normal and dry years. Projected shortages for 2005 under critical-year Central Valley Project Improvement Act cutbacks are approximately 33,000 ac-ft, or about 19 percent of the sub-basin's projected water need of approximately 170,000 ac-ft.

Proposed Projects

As shown on Figure 1 (at the end of this review), four projects were evaluated in the Redding Sub-basin, ranging from short- and long-term programs to short-term feasibility studies. Of these four, three were identified that could potentially produce water by 2003. Total cost of implementation for these short-term projects was estimated at approximately $2.9 million for conjunctive water management and $7.7 million for system improvement projects. A total of 49,000 ac-ft/yr was identified as potentially available from full implementation of the three short-term projects, with an associated cost totaling approximately

$22.9 million. The ongoing Redding Basin Water Resources Management Plan (Project 15A) is a long-term project and not included on Figure 1. Project plan participants include the 12 Redding Area Water Council (RAWC) members (City of Redding, ACID, Shasta County, City of Shasta Lake, City of Anderson, City of Cottonwood, Bella Vista Water Storage District, and five other local water supply agencies).

TABLE 1
Short-term Projects Proposed to Produce Water by 2003 in the Redding Sub-basin

Project / Proponent	Description	Supply (acre-feet/year)	Capital Cost ($)	Issues
ACID Conjunctive Use Program (Project 2B)	Groundwater wells for irrigation supply, exchange surface water supplies	5,000	3.0 million	Water rights, transfers, groundwater-level impacts
Total Conjunctive Water Management		**5,000**	**3.0 million**	
ACID Main Canal Modernization (Project 2C)	Improved flow controls, measurement, canal lining	10,000	2.7 million	Construction window limits, temporary construction right-of-way, possible environmental impacts
ACID Churn Creek Lateral Improvements (Project 2A)	Replace open ditch with pipeline, reduce seepage, eliminate pump station on river	9,000	5.4 million	Construction window limits, temporary construction right-of-way, possible environmental impacts
Total System Improvement		**19,000**	**8.1 million**	

Current Status of Projects

Each of the four projects has been initiated to varying degrees. The Shasta County Water Agency Redding Basin Water Resources Management Plan (Project 15A) has completed two major studies, including a detailed groundwater model of the sub-basin, and is beginning work on comprehensive long-term alternatives evaluations. The RAWC is seeking additional funding to support this next phase of the resources plan, and has received partial funding ($130,000) in the form of an AB 303 grant. ACID Conjunctive Use Program (Project 2B) is in the initial phases of improving local groundwater monitoring and limited pump testing to improve the accuracy of the groundwater model in this area. Initial feasibility efforts related to ACID Churn Creek Lateral Improvements (Project 2A) and the ACID Main Canal Modernization (Project 2C) are proposed to start in late 2001.

Existing Funding

As discussed above, each of these projects have some existing funding. The Redding Basin Water Resources Management Plan (Project 15A) secured an AB 303 grant, but needs an additional $120,000 in matching funds to secure this grant and begin work (current funding is in jeopardy because of the lack of sufficient funds to complete the proposed work). Project 2B has approximately $300,000 to begin the local monitoring program, but will need additional funding to begin installation of new production wells in the next phase of the

project. Each of the other two ACID projects (Projects 2A and 2C) has received $100,000 to support feasibility studies and conceptual design.

Interrelationship of Projects

The four projects in the Redding Sub-basin each have some interrelationships, either in terms of basic function and operation, or in terms of necessary political and institutional coordination. Project 2A and Project 15A are interrelated; RAWC provides the most effective local forum for addressing local concerns related to the conjunctive management project and providing feasible transfer partners who can benefit from improved surface water supply that ACID may be able to provide. The two ACID modernization projects may have long-term interrelationships with Project 2B through the potential impacts of the modernization projects on groundwater levels. Implementation of Project 2C, including lining of canal reaches with excessive seepage rates, may influence groundwater levels by reducing seepage from the ACID Main Canal, which in turn recharges the underlying aquifer. Similarly, Project 2A could potentially reduce recharge from the existing unlined Churn Creek Lateral by replacing the unlined lateral with a buried pipeline. Changes in local groundwater levels from these projects may impact existing groundwater users with wells that draw from relatively shallow depths. To address these potential impacts, implementation of Project 2B would include groundwater modeling to evaluate the potential combined impacts of the projects and provide information needed to modify the design and operation of the program to minimize these impacts.

Benefits

Implementation of both the short- and long-term projects would assist in meeting the Redding Sub-basin and other Sacramento Valley/south-of-Delta needs in both normal and dry years depending on operations. The short-term project yields alone could make a significant contribution to the quantity and reliability of supplies for the Redding Sub-basin under all water-year types. The 34,000 ac-ft of supply from these projects would be equal to about 20 percent of the sub-basin's projected 2005 needs, and could essentially eliminate the projected supply deficits under critical-year CVP supply cutbacks. The long-term projects are anticipated to have greater benefits in terms of increased overall seasonal water supply and reliability, as well as increased operational flexibility at the sub-basin level.

Implementation Challenges

Short-term Projects

The projects proposed to produce water by 2003 are anticipated to face relatively minor implementation issues. However, some stakeholders (including state representatives) are concerned that conjunctive management projects such as Project 2B could be operated so as to provide only limited in-basin benefits (i.e., in-basin needs would remain unmet while water would be exported to other users). Additionally, concerns have been raised by the U.S. Bureau of Reclamation (USBR) regarding the relationship between Sacramento River flows and local groundwater, specifically whether pumping groundwater within a certain minimum distance of the river, and from certain depths, can be determined to cause reductions in Sacramento River flows. ACID was precluded by USBR from participation in

the recent Forbearance Agreement based on these criteria. Strict application of these criteria to a short- or long-term conjunctive management program would limit the ability of such a program to provide benefits to water users outside of the Redding Sub-basin. The continuation of the ongoing water resources plan would further the relationship between existing participants. Related to the proposed system improvement projects, some habitat could also be impacted by the proposed improvements, but none that is likely utilized by listed species.

Long-term Projects

The long-term projects proposed in the Redding Sub-basin are generally future proposed phases of the short-term projects. In general, project benefits and impacts would need to be evaluated to account for district, sub-basin, basin, and south-of-Delta needs and to understand how best to coordinate the operation of related projects to maximize benefits.

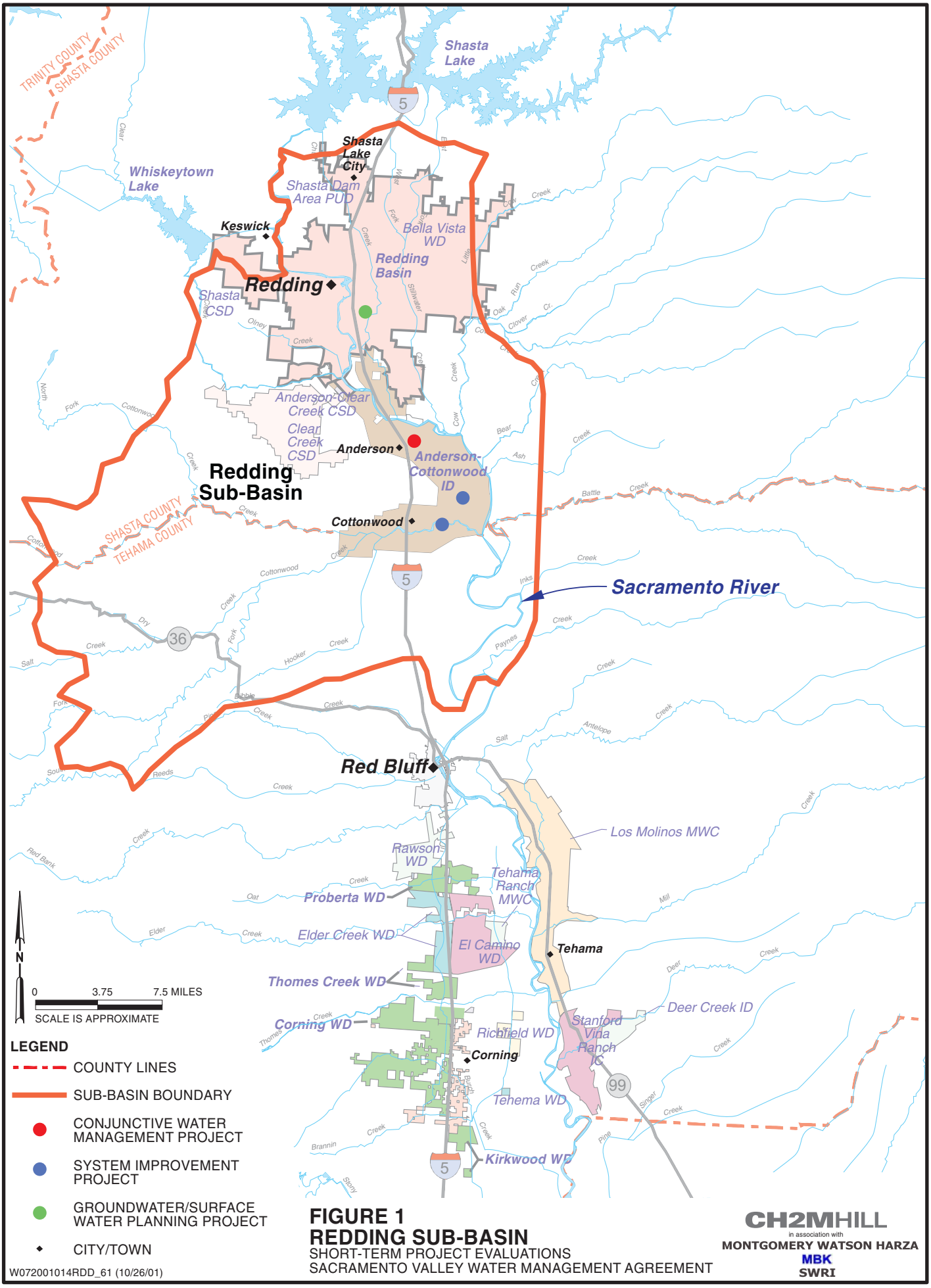

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FIGURE 1
REDDING SUB-BASIN
SHORT-TERM PROJECT EVALUATIONS
SACRAMENTO VALLEY WATER MANAGEMENT AGREEMENT

CH2MHILL
in association with
MONTGOMERY WATSON HARZA
MBK
SWRI